



**UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT  
SUBMITTAL REPORT**

Created on  
01-FEB-2021  
13:03:28

## Submittal Overview

Operator: BP Exploration & Production Inc. (02481)  
 Business Process: Pipeline Permits and Reports  
 Submittal Type: Plan of Corrective Action  
 Project Name: Nakika  
 Submittal Coordinator:  
 Submittal Status: Submitted  
 Submittal ID: 196848967  
 Status Date: 01-FEB-2021  
 Submittal Description: Na Kika Galapagos Loop Revised Corrective Action  
 Remarks: bp was able to move forward to execute the revised corrective action plan approved on December 17, 2020 as described in Section 3 of the attached revised plan. The revised CAP was executed on January 7 & 10, 2020 and the current status is detailed in Section 3.1.  
 bp requests to move forward to execute the additional corrective action for temporary loop reconfiguration as described in Section 4 of the revised plan and hereby submits the enclosed revised Corrective Action Plan to your office for review and approval.

## Metadata

Segment Number(s): 16283  
 ROW Number:  
 Regulatory Authority: DOI  
 Departing Area-Block: MC-519  
 Terminating Area/Block: MC-519  
 Departing  
 Facility/Well/PPL: SA PLEM #1  
 Terminating  
 Facility/Well/PPL: SA PLEM #2  
 ROW Permittee Name:  
 ROW Permittee Code:

## Submittal Statuses

Status	Creator	Created	Modifier	Last Modified
Submitted	o-garciaa	01-FEB-2021 13:03:27		
Remark				
Status	Creator	Created	Modifier	Last Modified
Draft	o-garciaa	01-FEB-2021 11:58:06	o-garciaa	01-FEB-2021 13:03:27
Remark				

## Variances

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01-FEB-2021  
13:03:28

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**NO VARIANCES**

## Contacts

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<b>Garcia, Adalberto</b>	Phone:		Email:	Adalberto.Garcia@bp.com
Contact Type:	Regulatory Contact 1			
Address:				

## Verbal Authorization

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**NO VERBAL AUTHORIZATIONS**

## Payments

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**NO PAYMENTS**

## Checklist

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**NO CHECKLIST**

## Requests for Information

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**NO RFIS**

## Associated Submittals

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**NO Associated Submittals**

# Galapagos LSPS Corrective Action Plan - Temporary Reconfiguration

## 1. Galapagos Layout

The Galapagos loop subsea production system (LSPS) is in the Mississippi Canyon Area (MC) Blocks 561 and 519, at water depths between 6,300ft and 6,550ft. The LSPS ties back to the host facility at Na Kika. Figure 1 illustrates a schematic of the field.

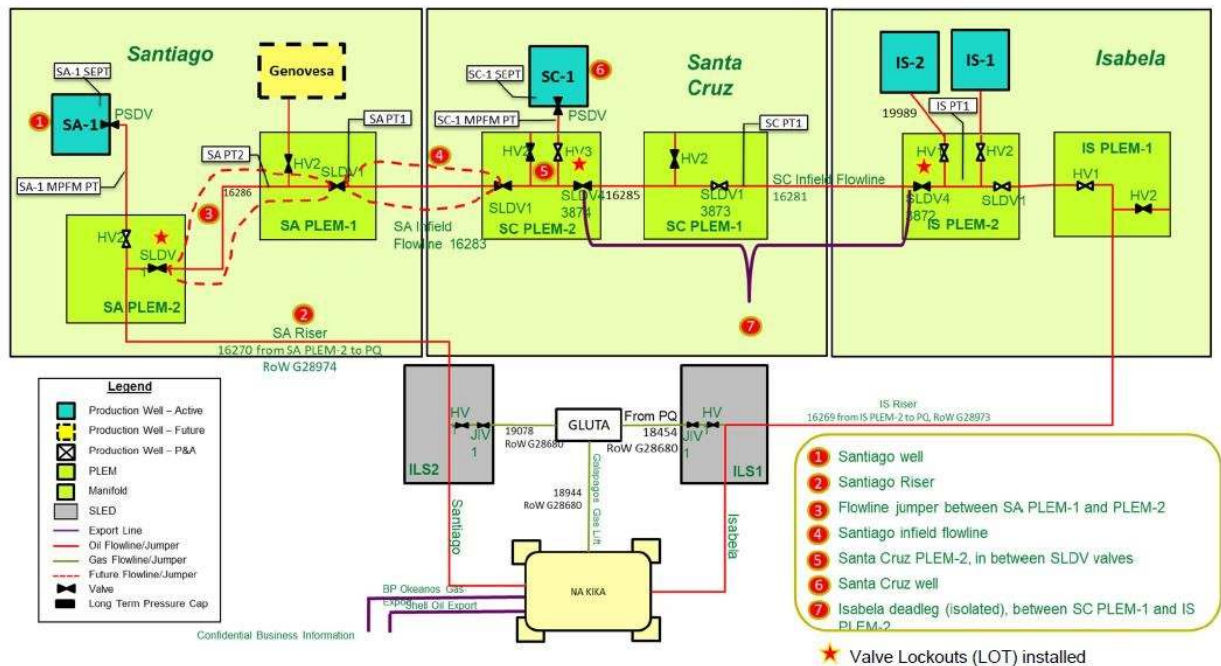


Figure 1: Field Schematic

## 2. History

The following information has led to implementation of a near-term Corrective Action Plan (CAP).

March 2020 – Santiago side of Galapagos Loop was shut in with dead oil and stabilized below hydrostatic pressure.

April 2020 - Ingress was identified through trending and ROV visual monitoring during an offshore campaign. ROV inspections did not identify any signs of an ingress point.

May 2020 – Diagnostics completed with ROV onsite during which SC PLEM2 and SA PLEM1 were exposed to above hydrostatic pressure (~3,300psi for 6hrs). Trending and ROV visual monitoring did not identify any fluid egress. No issues identified with SA flowline jumper, SA riser, SA Flowline and SA PLEM2. However, potential ingress location deemed to be either SC PLEM 2 or SA PLEM 1.

June 2020 – Further diagnostics completed but BP was unable to pinpoint ingress source.

July 2020 – Performed static 4,000psi pressure hold for ~23hrs. Trending and ROV visual monitoring did not identify any egress. Initiated dead oil circulation and after ~9.5hrs at 4,000psi and 120deg F, peasize bubbles were seen at SC PLEM-2 SLDV1 valve (1 bubble every 30-45s). No sign of egress was observed at SA PLEM1. Circulation was stopped, system was bled down below hydrostatic and

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egress rate decreased to 1 bubble per hour. ROV vessel returned for another inspection one week later and no bubbles were observed.

13 - 14 August 2020 – Lockout devices were installed on some SLDVs to maintain current isolations.

14 August 2020 – ROV inspection confirmed no further leak from SC PLEM2 SLDV1.

### 3. Summary of work performed under Corrective Action Plan (CA83P)

**3 - 5 September 2020** – Insulation was removed (Figure 2) at grease port locations and other areas where it had disbonded on the SLDV1 valve located at the SC PLEM2. While the insulation removal campaign was unable to identify the leak source, results indicated that additional insulation removal would increase the probability of determining the leak source.

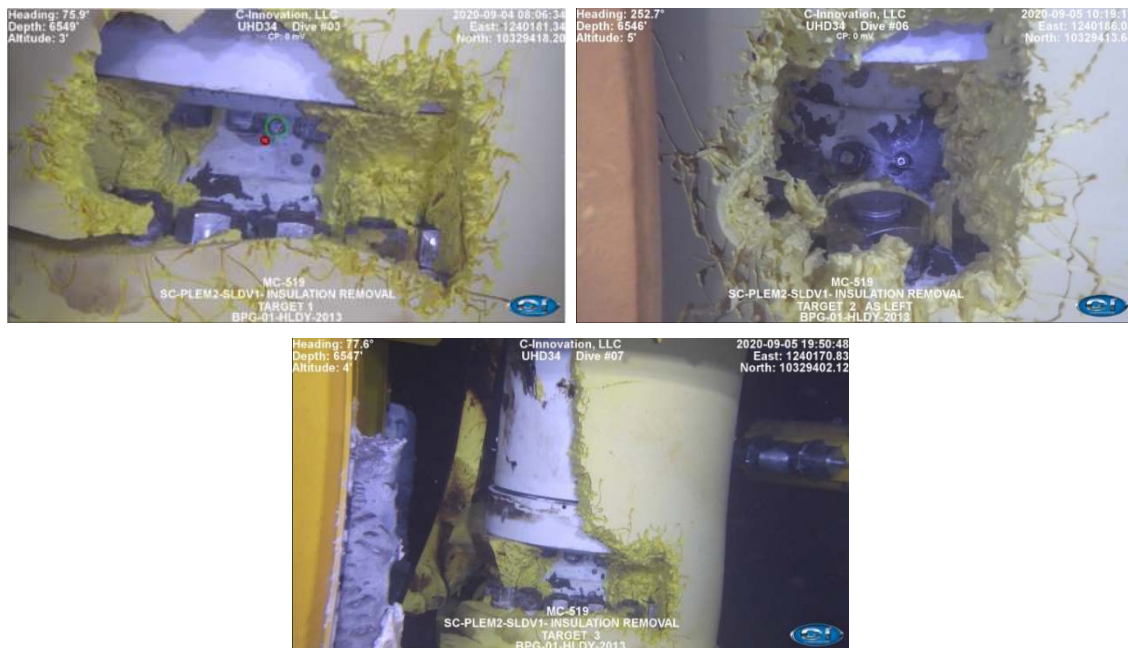


Figure 2: Insulation Removal Results for Grease Port and Disbonded Insulation (Targets 1-3)

**25 - 29 September 2020** – Following approval of previous Corrective Action Plan on 14 September 2020, additional insulation was removed (Figures 3 – 5) as attempts to pressurize the SC PLEM2 failed due to lack of communication to the bore.



Figure 3: Additional Insulation Removal Targets (Targets 4-6)

While additional insulation removal was unable to identify the leak source, visibility at the areas of interest (targets) had been improved and the likelihood of finding the leak source during pressurization has increased.



Figure 4: Insulation Removal Results for Targets 4, 5a and 5b



Figure 5: Insulation Removal Results for Target 6

**13 - 20 October 2020:** During this campaign, communication to the valve bore and subsequent pressurization was achieved via ROV. Presence of ingress/egress was not witnessed by ROVs during 44 hours of pressure testing as the SLDV1 valve at SC PLEM2 was cycled open to closed position for one (1) hour during the below hold times.

A summary of the pressures and hold times are provided below:

- First Test: Pressurized to roughly 5,000 psia at a hold time of 8 hours.
- Second Test: Pressurized to roughly 6,000 psia at a hold time of 24 hrs.
- Third Test: Pressurized to roughly 8,500 psia and held for 12 hrs.

**10 – 16 November 2020:** During dead oil circulation, the ROV observed dead oil or other fluid egress from the SLDV1 valve located at SC PLEM 2. The egress source origination point was identified as the gasket seal located between the valve bonnet and valve body; see Figure 6. ROV was utilized to collect the egressed volume located under the containment dome and the collected sample bottle returns [were sent to Core Labs for testing, which found no hydrocarbons in the samples](#). No additional egress points were identified during the circulation test.



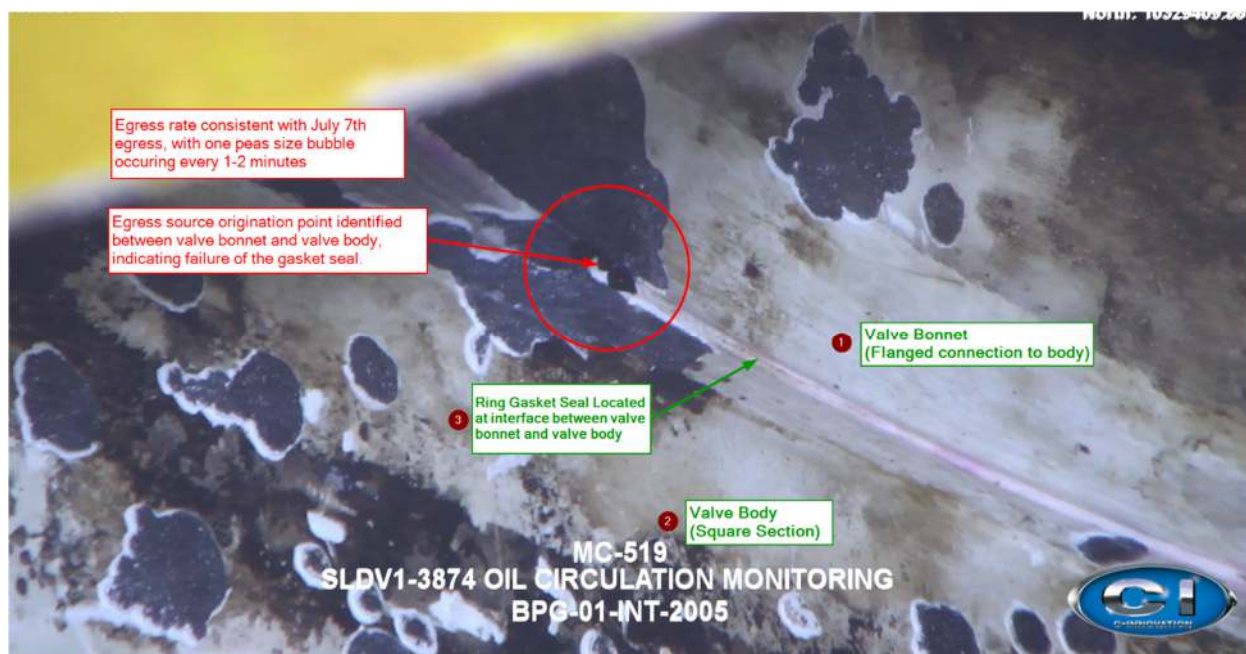


Figure 6: Egress Location

**Egress Details:**

Egress was witnessed at 14:40 on 15 November following roughly 36 hours of circulation. The egress rate was estimated to be a single pea size bubble ( $1 \text{ cm}^3$ ) releasing at an interval of 1 to 2 minutes. The last witnessed release was at 04:23 on 16 November, with the pressure in the SC2 PLEM returning to below hydrostatic conditions at roughly 5:15. The volume of the release is therefore estimated to be between  $411 \text{ cm}^3$  (.10 gal) and  $875 \text{ cm}^3$  (.23 gallons). No additional bubbles were observed after the pressure was returned to below hydrostatic conditions.

**7 – 10 January 2021:** Additional insulation removal was performed to provide access to the bonnet nuts for torqueing with the ROV (see figure 7 below). Following the completion of insulation removal, the ROV utilized a Hytorc hydraulic impact wrench to apply OEM specified torque (2,499 ft-lbs) to the flange nuts (qty 16), following the OEM/API recommended star pattern. A total of two passes were performed by the ROV, resulting in slight movement in several of the nuts (see figure 8). Following the completion of the torqueing, the ingress test was initiated and indicated no change to the pressure containment integrity of the joint.

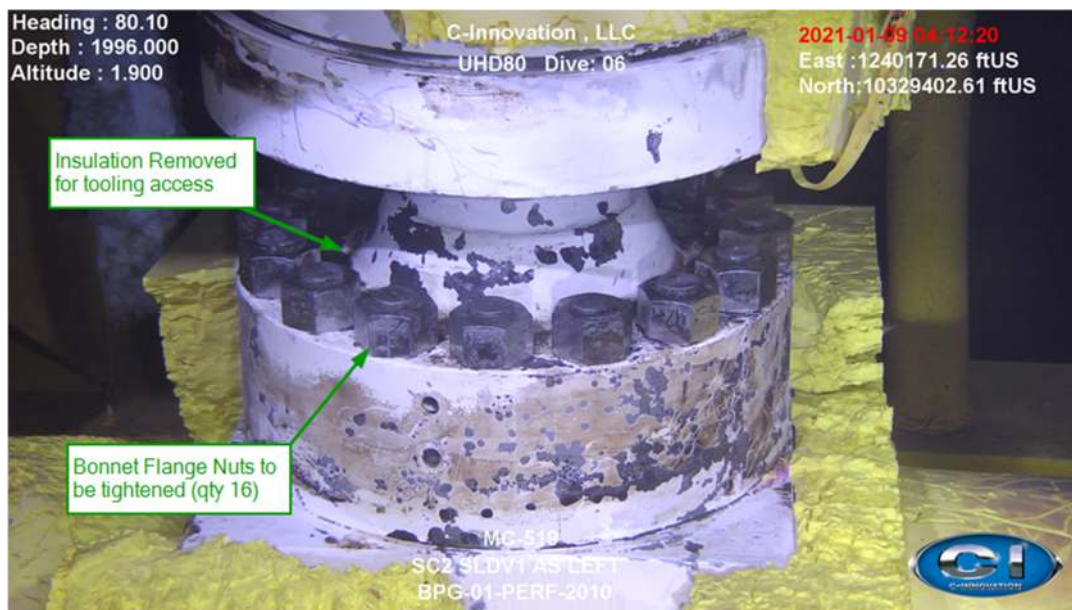


Figure 7: Completed Insulation Removal for Bonnet Bolt Access

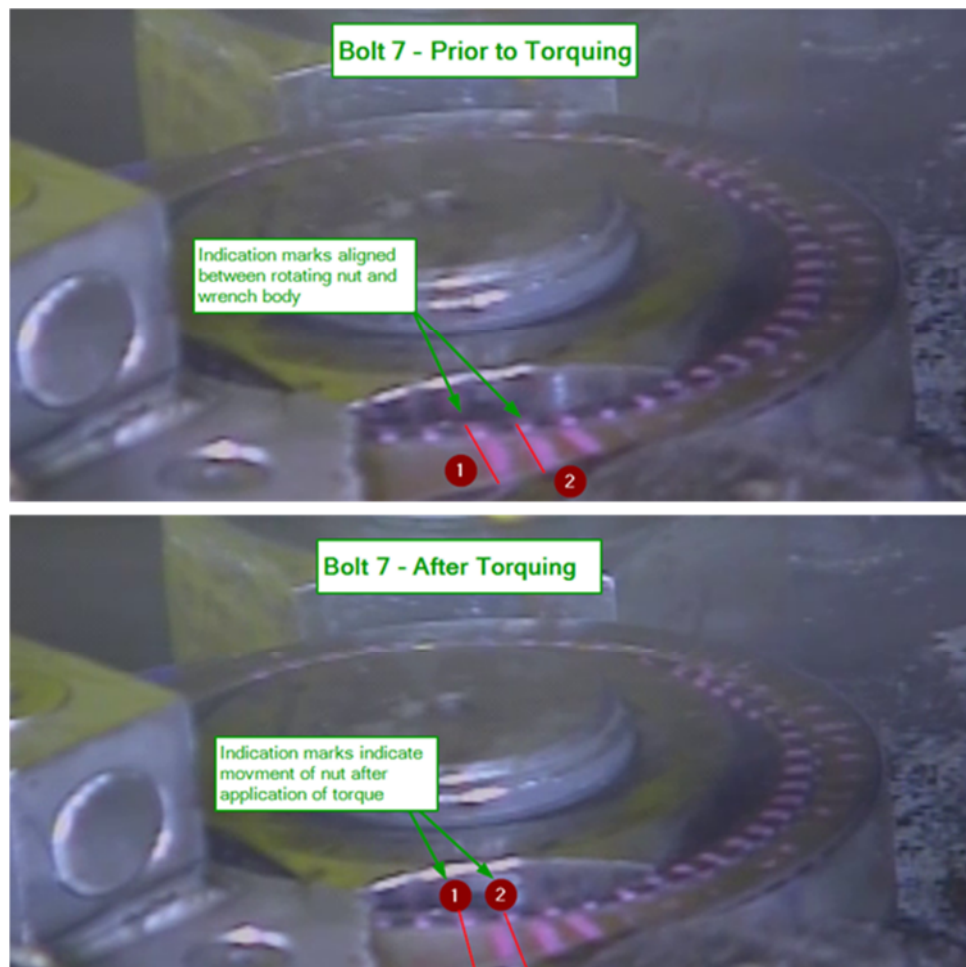


Figure 8: Nut Movement after Application of OEM Torque

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### 3.1 Current Status

The current status of the affected segments in the Galapagos loop is as follows:

- SC-1 and SA-1 wells remain shut in and safed-out.
- Flowline segment remains filled with dead oil at below hydrostatic ambient pressures (~2,900psi). Pressures are monitored via flowline transducers. System pressures as of 28 January 2021 are as follows:
  - SC PLEM-2 at 2,283 psi.
  - SA flowline at 2,130 psi
  - SA flowline jumper at 2,126 psi
- ROV installable mechanical valve lock closed devices remain installed on two (2) PLEM valves (SLDV1 3873 and SLDV4 3872) for LSPS loop isolation from the area of ingress/egress.

## 4. Corrective Action Plan - Temporary Reconfiguration

BP has developed a corrective action plan to execute a temporary reconfiguration of the LSPS loop to isolate the egress point at SLDV1-3874 located on SC PLEM2. Removal of this flowline jumper will enable installation of a pressure cap that will enable future flushing of dead oil from segment 16283 to support future remediation efforts, and will provide a safe tested barrier to isolate this segment of the flowline with the impaired valve from riser and Santiago/Genovesa flowline and riser sections.

A summary of the key plan tasks is provided below, with additional information provided in subsequent sections:

#### Removal of Existing Equipment:

1. Jumper Decommissioning of GV PLIS to SA PLEM1 Tie-In Jumper and SA1 to SA2 Flowline Jumper.
2. Installation and Leak Testing of Flowline Hub Caps on the end connections of the decommissioned jumper hubs (GV PLIS, SA BH1, SA FLH1, SA FLH2).

#### Temporary Reconfiguration of the LSPS Loop:

3. Removal of Flowline Hub Caps located at GV PLIS and SA FLH2
4. Installation of Temporary Jumper between GV PLIS and SA PLEM 2 and subsequent pressure testing of jumper assembly.

### 4.1 Jumper Decommissioning

#### Removal of Existing Tie-in Jumper

**Task:** Removal & Recovery of the existing tie-in jumper between GV PLIS and SA PLEM1.



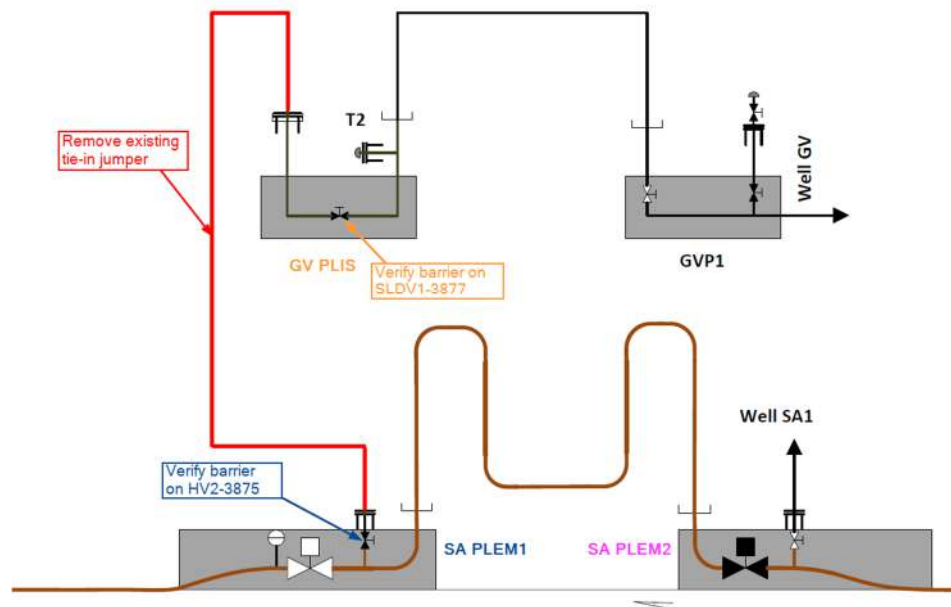


Figure 9: Removal of Existing Tie-in Jumper

**Equipment Status:** PLIS Jumper is currently filled with water based fluids (MEG/water) and has not flowed hydrocarbons since installation.

**Methodology:**

1. Verify barrier isolation to SLDV1-3877 located at GV PLIS and HV2-3875 located at SA PLEM1
2. ROV to cut jumper assembly into sections and place in subsea basket for recovery to the surface. Crane support may be required during cutting operations.
3. Jumper end connections to be removed via OEM Tooling and recovered to the surface.

**Permits Required:** Decommissioning application to be submitted to BSEE prior to offshore campaign execution.

## Removal of Existing Flowline Jumper

**Task:** De-oiling, Removal and Recovery of the existing flowline jumper between the SA PLEM1 and SA PLEM2.

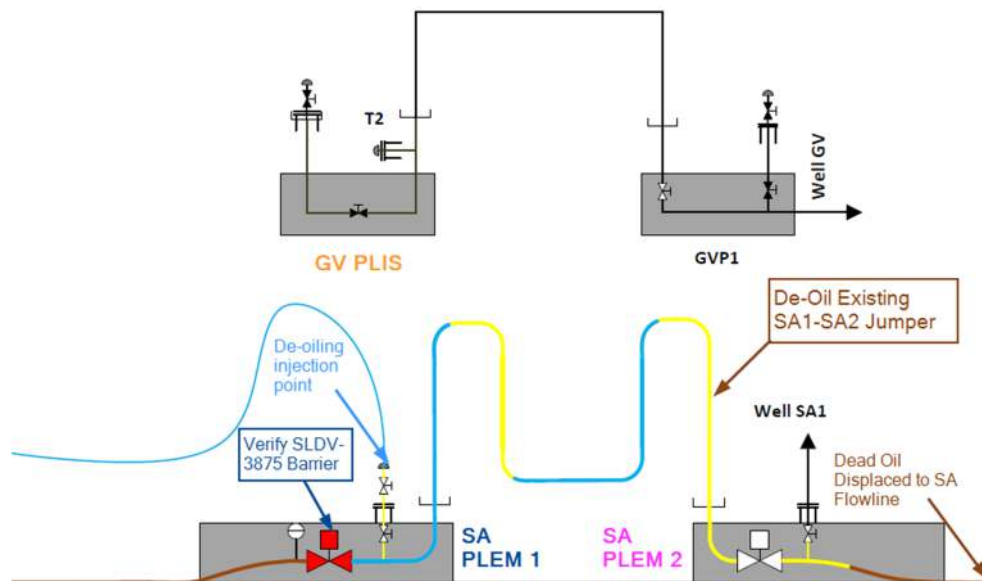


Figure 10: De-Oiling of Existing Flowline Jumper

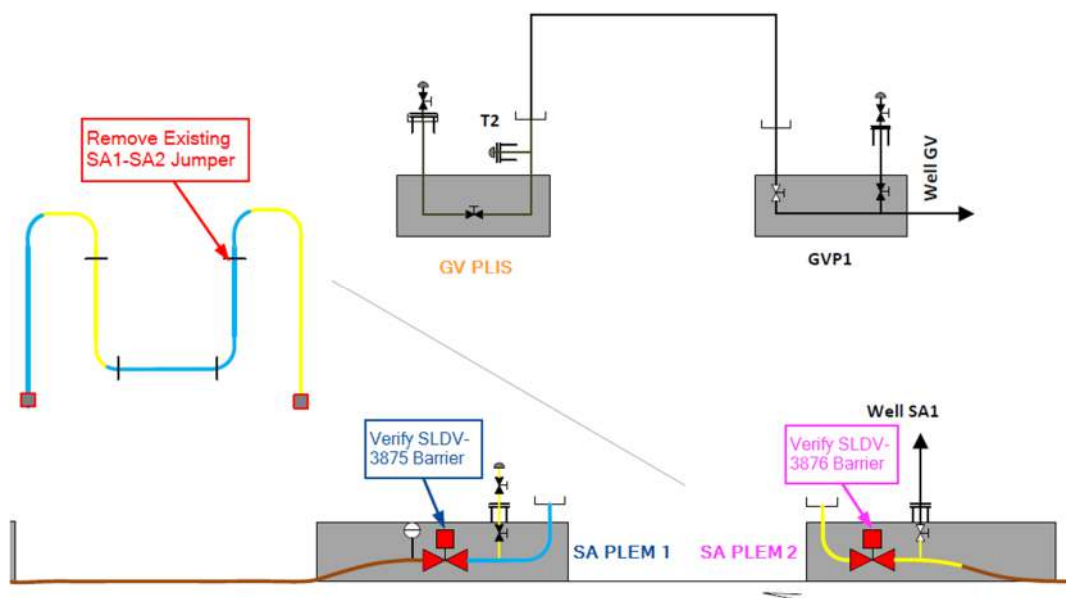


Figure 11: Removal and Recovery of Existing Flowline Jumper

**Equipment Status:** Jumper is currently filled with dead oil from previous hot oil circulation.

**Methodology:**

1. Verify barrier isolation at on SLDV1-3875 located at SA PLEM2.
2. Verify SLDV2-3876 located at SA PLEM2 is open to allow jumper fluid displacement to platform.
3. ROV to displace the existing dead oil in jumper by injection of two fluids via subsea pumping. To increase the efficacy of the de-oiling, fluids have been selected that have densities that are both above and below the existing production fluid, essentially bracketing the existing oil. Displacement fluids currently selected are Methanol and Mono-Ethylene glycol.

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4. ROV to cut jumper assembly into sections and place in subsea basket for recovery to the surface. Crane support may be required during cutting operations.
5. Jumper end connections to be removed via OEM Tooling and recovered to the surface.

**Permits Required:** Decommissioning Application to be submitted and approved by BSEE prior to offshore campaign execution.

## 4.2 CAP Installation & Leak Test

**Task:** Installation of flowline hub caps on the newly exposed flowline jumper hubs (GV PLIS, SA BH1, SA FLH1 SA FLH2) and subsequent leak test.

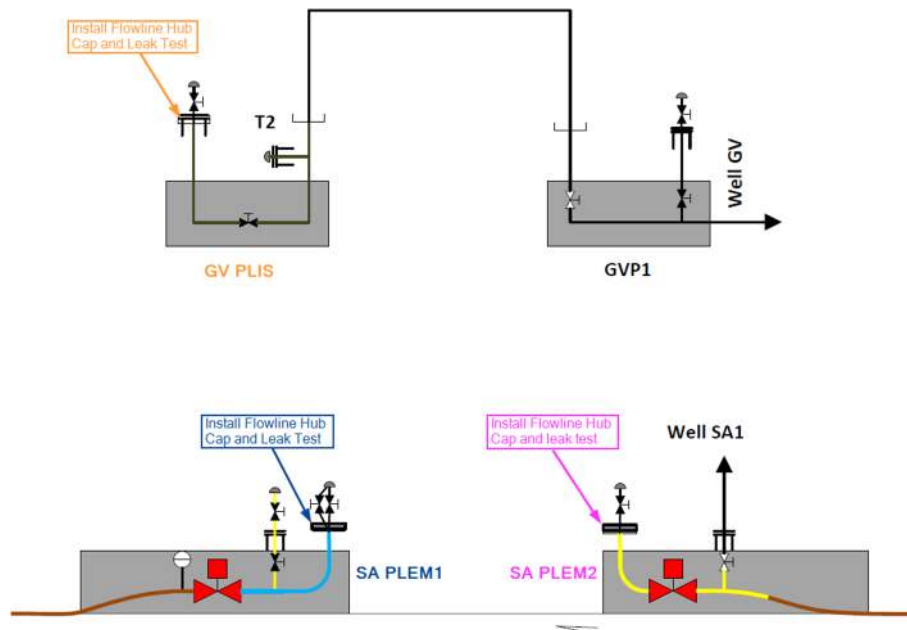


Figure 12: Cap Installation and Leak Test

**Equipment Status:** Refurbished flowline caps procured from OEM for field utilization. Caps are rated to MAOP of flowline and include necessary interfaces for ROV intervention. Existing flowline hubs have no known integrity issues.

### Methodology:

1. Deploy Caps with vessel crane and install on exposed flowline jumper hub(s) with ROV support.
2. Utilize ROV to Perform leak test to verify connection and barrier integrity.

## 4.3 Barrier Verification & CAP Removal

**Task:** Removal & Recovery of the GV PLIS and SA FLH2 caps.

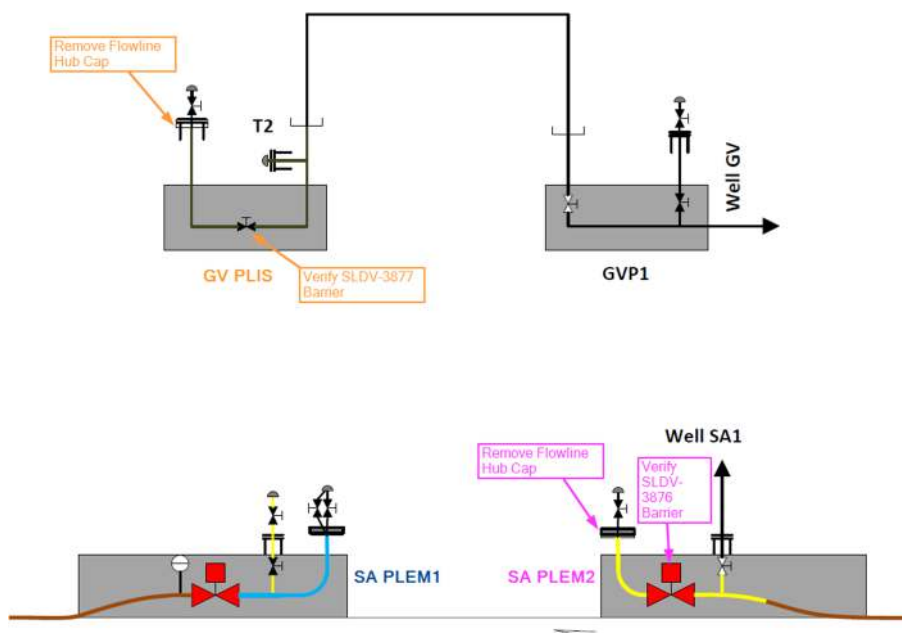


Figure 13: Barrier Verification &amp; CAP Removal

#### Methodology:

1. Verify barrier isolation at on SLDV1-3876 located at SA PLEM2 and the SLDV1-3877 located at GV PLIS
2. Utilize vessel crane and ROV to remove flowline hub caps and recover equipment to surface

## 4.4 Temporary Jumper Deployment & Installation

**Task:** Installation of Temporary Jumper between GV PLIS and SA2 PLEM and subsequent leak test(s).

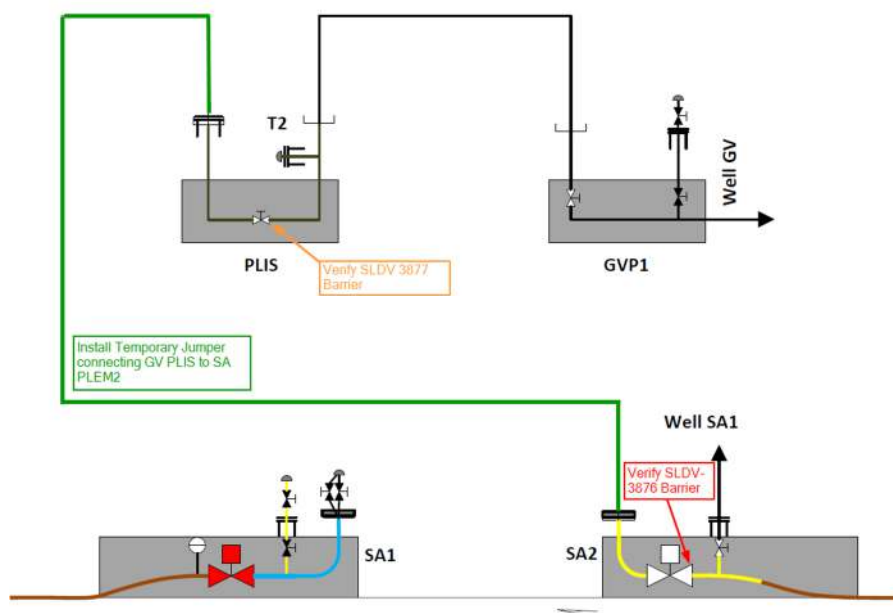


Figure 14: Temporary Jumper Install

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**Equipment Status:** The temporary Jumper is being fabricated (by Fieldwood Energy) and is currently on schedule to meet current offshore readiness dates. Final fabrication will commence after receiving metrology after in-place jumpers are removed. Jumper assembly to be rated to MAOP of flowline and include necessary interfaces for ROV intervention.

#### Methodology

1. Verify barrier isolation at on SLDV1-3877 located at GV PLIS and SLDV1-3876 located at SA PLEM2
2. Utilize vessel crane to deploy and install jumper assembly ends utilizing ROV support and required OEM tooling
3. Utilize ROV to perform jumper seal tests to verify connection and barrier integrity.

**Permits Required:** Fieldwood has submitted a lease-term pipeline permit request for this temporary jumper and a new segment number has been issued. Fieldwood Energy will provide approved permit prior to bp executing the offshore campaign .

## 4.5 Reinstatement

The temporary jumper will be leak tested to 1.1x MAOP following completion of the installation to confirm integrity of the reconfigured loop.

## 4.6 Risk Assessment Plan

All offshore operations will be risk assessed with mitigations in place for hazards identified.

## 5. Execution of Temporary Loop Reconfiguration CAP

BP plans to begin execution of the above-mentioned near-term CAP in Feb/March of 2021 upon BSEE's approval of all required regulatory documents.

BP is working on generating long-term Corrective Action Plans to mitigate the egress on the SLDV-3874 located at SC2 PLEM. Those plans would be finalized based on the findings from previous remediation campaigns, and may include:

- Additional Repair Attempts
- Recover the PLEM from seabed and replace/repair.

Any new Corrective Action Plan that is prepared will be submitted to BSEE for approval.



**Adalberto Garcia**  
Regulations Compliance Advisor

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February 1, 2021

Ms. Angie Gobert  
Pipeline Section Chief  
Bureau of Safety and Environmental Enforcement  
1201 Elmwood Park Boulevard  
New Orleans, Louisiana 70123-2394

Reference: 2020 Plan of Corrective Action - Revised  
Segment No. 16283

Ms. Gobert:

BP Exploration & Production Inc. (bp) requests approval for a revised plan of corrective action regarding the diagnostics and location of a point of ingress/egress in Segment 16283 of the Na Kika field. Segment 16283 is currently out of service because a point of ingress/egress was observed by ROV inspection on 07 July 2020, at which point the line was shut-in, displaced with dead oil and depressurized. The point of ingress/egress was observed to be near the SLDV1-3874 valve at the Santa Cruz PLEM #2.

bp was able to locate the point of ingress/egress in the same segment using the corrective action plan (CA83P) approved on November 2, 2020 as given in detail in Section 3 of the attached plan.

bp was able to move forward to execute the revised corrective action plan approved on December 17, 2020 as described in Section 3 of the attached revised plan. The revised CAP was executed on January 7 – 10, 2020 and the current status is detailed in Section 3.1.

bp requests to move forward to execute the additional corrective action for temporary loop reconfiguration as described in Section 4 of the revised plan and hereby submits the enclosed revised Corrective Action Plan to your office for review and approval.

If you have any questions, please contact the undersigned at 281-995-2815 or [Adalberto.Garcia@bp.com](mailto:Adalberto.Garcia@bp.com)

Sincerely,

A handwritten signature in blue ink, appearing to read "Adalberto Garcia".

Adalberto Garcia  
Regulations Compliance Advisor

Attachments:

Proposed Revised Near-Term Execution Plan for Galapagos LSPS Response – Temporary Loop Reconfiguration